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FINANCIAL CAPITAL REPORTING, MANUFACTURED CAPITAL REPORTING, ENVIRONMENTAL CAPITAL REPORTING AND FIRM VALUE OF LISTED COMPANIES IN KENYA.

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Abstract: This study examines the effect of financial capital reporting, manufactured capital reporting, and environmental capital reporting on the firm value of companies listed on the Nairobi Securities Exchange. Using a balanced panel dataset of NSE-listed firms observed annually over the period 2015–2022, the study applies a panel regression framework to account for repeated observations of the same firms over time and to control for unobserved firm-specific characteristics that could confound the reporting–value relationship. Secondary data are extracted using a structured data collection instrument and verified for completeness and consistency prior to estimation. The regression results indicate that financial capital reporting has a strong positive and statistically significant association with firm value, implying that improved disclosure and stewardship of financial capital is highly value-relevant to investors. Manufactured capital reporting is also positively and significantly related to firm value, suggesting that clearer reporting on productive assets and operational capacity enhances market valuation. Environmental capital reporting shows a positive and statistically significant relationship with firm value, although the effect appears comparatively weaker, indicating that environmental disclosures are valued but may be more sensitive to firm-specific conditions and sector characteristics. The findings support the conclusion that stronger multi-capital reporting is associated with higher firm value among NSE-listed firms. The study recommends strengthening the quality, consistency, and comparability of multi-capital disclosures to enhance market confidence and valuation outcomes.

Key words: financial capital reporting, manufactured capital reporting, environmental capital reporting, firm value, Nairobi Securities Exchange, panel regression.

I. Introduction

Contemporary capital markets increasingly price firms on more than short-term earnings, because a growing share of enterprise value is embedded in capabilities, infrastructure, resilience, and externalities that are not fully captured by traditional financial statements. Over the last decade, reporting practice and research have therefore shifted from "stand-alone" financial or sustainability reports toward integrated narratives that connect strategy, governance, performance, and prospects across multiple capitals (Turzo et al., 2022). A central argument in this shift is the "value gap": investors and other stakeholders struggle to explain differences between book values and market valuations when disclosures do not clearly connect business models to the stocks of capital that generate future cash flows (Velte, 2022). In parallel, stakeholder demands for decision-useful non-financial information have intensified, especially around environmental and social risk, governance quality, and long-run value creation (Tsang et al., 2023). Empirically, recent international evidence using 2,707 firm-year observations across 41 countries reports that integrated report readability and tone are positively associated with market value of equity, suggesting that how firms communicate multi-capital value creation can shape valuation outcomes (Hossain et al., 2025). In this global context, the study of financial capital reporting, manufactured capital reporting, and environmental capital reporting becomes salient because each capital represents a distinct channel through which information can influence perceived risk, growth options, and ultimately firm value.

At the global level, integrated reporting research increasingly emphasizes that "quality" and "connectivity" matter: investors respond less to the mere presence of a report and more to disclosures that credibly link capitals to strategy, trade-offs, and future performance. For example, cross-country evidence indicates that the value relevance of integrated reporting quality varies with the legal environment and institutional features that shape credibility and enforcement (Panfilo et al., 2025). On the other hand, where adoption is selective and quality inconsistent, investors may struggle to price IR information reliably, reinforcing mixed empirical findings (Opanyi & Omare, 2022). Similarly, work on measurement shows that integrated reporting quality remains heterogeneous across firms and

settings, implying that comparability challenges can dilute capital-market usefulness unless reporting is anchored to consistent constructs (Nada & Győri, 2023). Omare, D. A., (2026) ascertained that firms listed at the the NSE adopting IR were doing well as compared to the firms not adopting IR. These findings motivate deeper attention to the "capital-specific" content of disclosures—especially financial, manufactured, and environmental capitals—because they describe the resources and relationships through which firms transform inputs into outcomes. In effect, firm value becomes an outcome of both real performance (cash flows, risk) and informational performance (how convincingly a firm explains value creation across capitals).

Financial capital reporting remains the most established disclosure domain and a foundational driver of valuation because it shapes expectations of profitability, liquidity, solvency, and growth capacity. Yet, global debates question whether conventional financial reporting alone is sufficient for sustainable development and long-run valuation, given increasing exposure to systemic risks and stakeholder expectations (Palea, 2018). In African and other emerging markets, the valuation role of financial capital reporting is further complicated by enforcement differences, varying investor sophistication, and uneven market liquidity. Evidence from Africa finds that IFRS adoption can affect firm value, consistent with the view that higher comparability and transparency may reduce information risk and influence market valuation (Agyei-Boapeah et al., 2020). Complementary evidence from Ghana shows that IFRS adoption is associated with reduced earnings management and improved financial reporting quality, which is typically expected to support investor confidence and capital allocation efficiency (Mensah, 2021). However, such benefits are not automatic: where enforcement and governance are weak, high-quality standards may not translate into high-quality reporting, leaving valuation gains uncertain. This justifies studying financial capital reporting as a distinct construct, rather than assuming that compliance or adoption alone drives firm value.

Manufactured capital reporting (covering physical assets, infrastructure, production capacity, and capital expenditure discipline) is increasingly important as markets assess the durability of competitive advantage and the efficiency with which firms convert physical capacity into cash flows. In emerging economies, manufactured capital can be a primary constraint on scale, cost competitiveness, and supply reliability, making related disclosures potentially value-relevant. Multi-country evidence from emerging economies shows that ESG performance can support value creation through improved product-market outcomes (sales growth and returns on sales), implying that operational and infrastructural capabilities—often embedded in manufactured capital—contribute to long-run value generation (Bashir et al., 2023). At the firm-level disclosure frontier, research on intellectual and related capital within integrated reports shows that capital-specific disclosure quality can affect firm value, reinforcing the logic that investors reward clearer explanations of how capital stocks translate into future benefits (Salvi et al., 2020). Further, empirical work has examined how firms disclose planned manufactured capital investment and how such disclosures can inform stakeholder judgments about future operational capacity and risk (Zaw, 2019). These studies collectively suggest that manufactured capital reporting can influence valuation by clarifying investment horizons, asset productivity, maintenance backlogs, and modernization strategies, which are central to future cash flows.

Environmental capital reporting (often operationalized as natural/environmental capital disclosures and, more broadly, ESG environmental performance) has become more directly linked to valuation as climate risk, regulation, and stakeholder pressure intensify. In contexts where resource dependence is high and environmental externalities are increasingly priced, environmental capital reporting can act as a signal of risk management, compliance readiness, and resilience. Yet disclosure can also be symbolic rather than substantive. For instance, research examining integrated reporting and environmental disclosure finds evidence that natural capital can be neglected or treated in ways consistent with legitimacy-seeking rather than deep integration into the business model (Gelmini & Vola, 2021). At the same time, capital-market studies show that climate-risk disclosure can be associated with market value of equity, consistent with investors pricing transparency about exposure and adaptation capacity (Vestrelli et al., 2023). The valuation pathway is therefore ambiguous: environmental capital reporting can reduce perceived risk and improve legitimacy, but it can also expose liabilities or be discounted if credibility is low. This ambiguity strengthens the need to test the environmental capital–firm value link empirically in specific markets such as Kenya's.

Regionally, African capital markets face persistent valuation challenges linked to thin trading, concentrated ownership, macroeconomic volatility, and episodic governance shocks—factors that can amplify the role of disclosure in shaping firm value. In such settings, the market may be especially sensitive to credible signals about cash-flow protection (financial capital), productive capacity (manufactured capital), and exposure to environmental risk (environmental capital). Conceptually, the "green" extension of valuation models argues that firms with stronger environmental performance and strategy alignment can experience different valuation dynamics because environmental risks and opportunities affect cost of capital and future growth (Faria et al., 2022). Meanwhile, cross-regional reviews of ESG disclosure research emphasize the heterogeneous impact of ESG factors on firm outcomes,

warning against assuming uniform valuation effects across jurisdictions and sectors (Saini et al., 2025). Thus, for Africa—and East Africa in particular—the practical question becomes which specific disclosure domains are most value-relevant under local institutional realities.

Narrowing to Kenya, listed companies at the Nairobi Securities Exchange (NSE) have experienced recurring concerns about firm value, as reflected in volatility in market valuations, investor confidence sensitivity, and the continuing policy push for better corporate disclosure and governance. Kenya-specific empirical evidence shows that sustainability reporting can be associated with firm value among NSE-listed firms when examined over longer panels; for example, one study covers 64 listed companies over eleven years (2012–2022) and motivates sustainability disclosure as part of value-relevant information in Kenya's market (Serem et al., 2024a). Related Kenyan evidence further investigates how corporate governance can condition the sustainability reporting–value relationship, suggesting that credibility mechanisms matter for how disclosures translate into valuation (Serem et al., 2024b). In the same market, integrated financial reporting has also been examined as a driver of firm value, reinforcing the relevance of disclosure quality to valuation in the NSE setting (Gathoni & Muiru, 2023). These Kenya-based studies indicate that disclosure is not merely compliance; it can be part of the information set investors use to form expectations about risk and future performance, especially where information asymmetry is high.

Kenyan evidence also points to mixed and sometimes controversial valuation effects of specific ESG dimensions. A recent Kenya study using 54 NSE firms that published annual reports between 2017 and 2023 applies a dynamic generalized method of moments approach and reports that governance performance is positively related to firm value, while lagged social performance can be negatively related and environmental performance may be insignificant in that setting (Muchiri et al., 2025). This pattern suggests that investors may prioritize governance signals as more immediately credible or more directly linked to cash-flow protection, while environmental information may not yet be consistently priced—possibly due to measurement challenges, uneven disclosure quality, or limited analyst integration. At the same time, studies in Kenya continue to document that firm value is sensitive to traditional financial drivers such as leverage and liquidity, underscoring that valuation remains constrained by capital structure risk and market conditions (Musyimi et al., 2025). The implication is that Kenya's firm value problem is multi-dimensional: market valuation responds to both "hard" financial fundamentals and the credibility of multi-capital narratives that explain how firms will sustain value under uncertainty.

Against this background, examining financial capital reporting, manufactured capital reporting, and environmental capital reporting together offers a coherent framework for explaining firm value in Kenya's listed sector. Recent Kenya evidence has begun isolating capital-specific effects within integrated reporting adoption. For instance, financial capital reporting has been empirically tested for its direct association with the firm value of listed companies in Kenya, framing financial capital disclosures as core signals about funding capacity, returns, and financial resilience (Omare et al., 2025a). Similarly, manufactured capital reporting has been tested as a direct predictor of firm value, emphasizing the role of disclosed physical and infrastructural capability in shaping investor expectations (Omare et al., 2025b). Meanwhile, Kenya-based work also documents that environmental sustainability reporting can be related to firm performance among NSE firms, further motivating environmental capital reporting as a potentially value-relevant disclosure stream (Kipngetich & Gatauwa, 2024). However, the existing evidence remains fragmented: some studies focus on broad sustainability reporting, others on ESG dimensions, and others on single capitals—often with different measures of firm value, different samples, and varying controls for endogeneity and governance.

Therefore, a focused study titled Financial Capital Reporting, Manufactured Capital Reporting, Environmental Capital Reporting and Firm Value of Listed Companies in Kenya is timely for three main reasons. First, it responds to the global shift toward multi-capital valuation and the documented importance of disclosure quality and credibility for firm value outcomes. Second, it addresses regional and local uncertainty about which disclosure domains the market prices most strongly, particularly in emerging markets where institutional conditions shape information usefulness. Third, it contributes to Kenya-specific policy and practice needs by providing evidence on whether capital-specific disclosures—financial, manufactured, and environmental—help explain firm value beyond conventional financial determinants, and whether improved capital reporting can reduce information asymmetry and strengthen investor confidence in NSE-listed firms. By adopting a multi-capital lens, the study aligns with contemporary reporting evolution while grounding its inquiry in the valuation challenges and disclosure realities of Kenya's listed companies.

II. Literature Review and Hypotheses Development

2.1 Theoretical Review

Stakeholder theory provides a strong foundation for anchoring the relationship between financial capital reporting, manufactured capital reporting, environmental capital reporting, and firm value among Nairobi Securities Exchange (NSE) listed firms because it conceptualizes the firm as dependent on multiple stakeholder groups whose support determines access to critical resources (Freeman, 1984). Under this view, multi-capital reporting is not simply disclosure compliance; it is an accountability and communication mechanism through which firms explain how they deploy financial resources (financial capital), build and maintain productive capacity (manufactured capital), and manage ecological dependencies and impacts (environmental capital) to sustain value creation over time (Velte, 2022). When investors, lenders, regulators, employees, customers, and communities demand transparency about these capitals, higher-quality reporting can reduce information asymmetry, strengthen trust, and lower stakeholder conflict costs—channels that can improve financing conditions and operational stability, and thus raise firm value (Tsang et al., 2023; Hossain et al., 2025). Empirical work supports this logic by showing that stakeholder pressure is positively associated with integrated reporting quality, implying that firms enhance the credibility and completeness of integrated disclosures when salient stakeholder groups expect better information (Vitolla et al., 2019). In Kenya, where disclosure practices and ESG maturity can vary across issuers, stakeholder theory therefore predicts that NSE firms providing clearer, decision-useful capital-specific disclosures may be better positioned to attract capital and legitimacy-sensitive customers, ultimately reflecting in stronger market valuation (Serem et al., 2024).

Legitimacy theory complements stakeholder theory by explaining why firms may emphasize multi-capital reporting to align corporate actions and disclosures with prevailing social norms and expectations, thereby protecting their "license to operate" and reducing legitimacy-related risk (Suchman, 1995). From a legitimacy perspective, environmental capital reporting is particularly salient because pollution, climate exposure, resource scarcity, and compliance failures can trigger reputational penalties, regulatory scrutiny, and cost shocks that markets may price into firm value (Vestrelli et al., 2023). Likewise, manufactured capital reporting can serve to legitimate claims about operational reliability, infrastructure resilience, and long-term investment discipline—especially important where stakeholders are sensitive to service continuity, safety, and supply-chain robustness. However, legitimacy theory also cautions that disclosure can be symbolic: if environmental or multi-capital narratives are boilerplate or selectively framed, markets and stakeholders may discount them, limiting valuation benefits and raising concerns about greenwashing (Gelmini & Vola, 2021; Velte, 2022). Consistent with this, evidence suggests the value relevance of reporting quality depends on institutional features (e.g., legal environment and enforcement), which shape how credible disclosures are perceived by market participants (Panfilo et al., 2025). Together, stakeholder and legitimacy theories justify examining whether—and under what conditions—capital-specific reporting quality among NSE-listed firms is associated with higher firm value, because valuation effects are expected to depend on both stakeholder salience and perceived legitimacy of the disclosures.

2.2 Literature Review and Hypotheses Development

Integrated reporting (IR) and related multi-capital reporting frameworks have expanded globally as firms try to explain how value is created over time by connecting financial outcomes with strategy, governance, and performance across multiple capitals (financial, manufactured, and natural/environmental among others). Yet, the empirical literature remains divided on whether capital-based disclosures consistently translate into higher firm value, partly because studies operationalize disclosure differently (adoption vs quality vs capital-specific indices), apply different valuation proxies (e.g., Tobin's Q, market-to-book, market value of equity), and examine different institutional environments (voluntary vs mandatory regimes and varying investor sophistication). Meta-evidence suggests that disclosure quality tends to matter more than simple adoption, but the magnitude and even direction of effects can still vary with context and measurement choices (Zennaro et al., 2024).

2.2.1 Financial capital reporting and firm value

Financial capital reporting in the IR sense goes beyond traditional financial statements to emphasize how a firm obtains, allocates, protects, and grows financial capital in ways consistent with long-term value creation. In theory, higher-quality financial capital reporting should improve firm value by reducing information asymmetry and perceived risk, strengthening investor monitoring, and lowering financing costs. Empirical work supports several of these channels. For example, integrated reporting quality has been shown to be negatively associated with the cost of equity capital, suggesting that clearer and more decision-useful disclosure can reduce investors' required returns and support valuation (Vitolla et al., 2020). Similarly, voluntary IR adoption has been linked to higher earnings quality, implying improved reporting discipline that can enhance credibility and, over time, market valuation (Obeng et al., 2020). Evidence from debt markets also indicates that integrated reports may provide incremental information

beyond conventional financial reports: firms producing integrated reports tend to face a lower cost of debt, and IR can strengthen the inverse relationship between financial reporting quality and cost of debt—consistent with lenders pricing disclosure quality (Muttakin et al., 2020).

However, the "financial capital reporting → firm value" link is not universally positive. Using an international sample of voluntary adopters, Wahl et al. (2020) found no significant effect of voluntary IR publication on analyst forecast accuracy or firm value, concluding that benefits may be limited when baseline disclosure is already high or when reports are not sufficiently decision-useful. This tension aligns with broader synthesis results: while meta-analysis finds that integrated reporting quality is positively associated with market valuation on average, effects differ across settings and study designs, implying that some markets reward capital reporting more strongly than others (Zennaro et al., 2024). Recent evidence also indicates that not only *what* is disclosed but *how* it is communicated matters: integrated report readability and tone have been linked to market value of equity, implying that accessible, credible narratives can increase the value relevance of disclosed financial-capital-related information (Hossain et al., 2025).

In Africa, institutional reforms and reporting infrastructure can shape valuation effects. For example, IFRS adoption has been associated with firm value for African listed firms, suggesting that financial reporting improvements can be priced by markets, though the strength of the link depends on firm and country conditions (Agyei-Boapeah et al., 2020). Within Kenya, disclosure heterogeneity remains a recurring theme. Injeni et al. (2019) document that IR-related disclosures in NSE annual reports vary substantially across firms and are shaped by firm-level characteristics—conditions that can confound simple disclosure–value relationships if selection effects are not controlled. Injeni et al. (2022) further show heterogeneity in sustainability and integrated report information disclosures in Kenya, reinforcing that disclosure levels are systematically related to agency- and institutional-related factors. On outcome linkages, Kenyan evidence is emerging: studies report a positive association between integrated reporting and firm value for NSE-listed firms (Opanyi & Omare, 2022), and capital-specific work finds that financial capital reporting is positively associated with firm value among Kenyan listed companies, supporting the "value relevance" argument in the local market (Omare et al., 2025). Collectively, this literature suggests that financial capital reporting can be value relevant, but that effects are likely conditional on disclosure quality, credibility, and market context, motivating capital-specific tests in Kenya where disclosure maturity and enforcement are still evolving.

2.2.2 Manufactured capital reporting and firm value

Manufactured capital reporting focuses on physical and produced resources—plants, equipment, infrastructure, technology-enabled production capacity, logistics networks, and maintenance/investment plans—that enable firms to deliver products and services and remain competitive. In valuation terms, manufactured capital disclosures can matter because they reveal (i) the firm's operating capacity and efficiency, (ii) capital investment strategy and future cash flow potential, and (iii) asset resilience and operational risk. Yet compared with financial capital and ESG reporting, manufactured capital reporting has received less direct empirical attention, and the available evidence often appears within "multiple capitals" or "six capitals" disclosure designs rather than as a standalone stream.

A growing multi-capitals literature indicates that markets can reward higher-quality disclosure about how capitals—including manufactured capital—contribute to value creation. In China, Sun et al. (2022) developed a multiple capitals disclosure (MCD) quality index based on the six capitals framework and found that higher MCD quality is associated with greater firm value, suggesting investors price more integrated, multi-capital explanations of value creation. Complementing this, research examining how integrated reports embed the six capitals into value-creation narratives finds that firms differ in the depth and connectivity of capital disclosures, implying that "manufactured capital reporting quality" is uneven and may be a meaningful differentiator in market perceptions (Disclosing value creation in integrated reports according to the six capitals, 2023). Related evidence on disclosure evolution suggests that reporting improvements may be stronger for some capitals than others, with manufactured capital sometimes lagging—again indicating why capital-specific measurement can change empirical results (Effects of integrated reporting on corporate disclosure practices…, 2023).

Because manufactured capital is tightly linked to investment policy, some studies connect valuation to the economic substance underlying manufactured capital—especially capital expenditures (capex)—even when the focus is not explicitly "reporting." For instance, evidence shows that capex decisions interact with corporate risk management and are reflected in Tobin's Q, implying that markets value the firm's physical investment posture and the risks surrounding it (Capital expenditures, corporate hedging and firm value, 2021). This strengthens the argument that forward-looking manufactured capital disclosures (e.g., planned investments, capacity expansion, asset renewal) could be valuation relevant when credible and decision-useful.

In Kenya, capital-specific evidence is beginning to appear. Manufactured capital reporting has been found to have a positive and significant impact on firm value among listed Kenyan companies, suggesting that transparency about physical capital and operational capacity can be rewarded in the NSE setting (Omare et al., 2025). Even so, the manufactured-capital stream remains comparatively thin, and it is often unclear whether observed valuation effects reflect (i) true incremental information content, (ii) broader "good governance" or "better-managed firms disclose more" selection effects, or (iii) sector composition (asset-heavy vs asset-light firms). These gaps support further study designs that isolate manufactured capital reporting quality and control for firm characteristics and industry differences in Kenya.

2.2.3 Environmental capital reporting and firm value

Environmental capital reporting (often discussed as natural capital, environmental disclosure, or the "E" in ESG) addresses how firms depend on and affect ecosystems, resources, emissions, and environmental risks, and how they manage these impacts. The valuation logic is increasingly well established: environmental disclosures can influence firm value through risk pricing (regulatory, litigation, and transition risks), reputation and consumer preference, operational efficiency (resource intensity), and access to sustainable finance. Empirically, a substantial body of work links ESG/environmental performance and disclosure to valuation, though results can be sensitive to measurement and context.

On the global evidence, ESG performance has been shown to be associated with firm value, with disclosure playing a moderating role—implying that transparency can shape how markets interpret ESG strengths and weaknesses (Fatemi et al., 2018). Other studies find positive associations between ESG metrics and firm value and profitability, suggesting that markets can reward stronger ESG profiles, although environmental scores sometimes show weaker direct valuation effects than social or governance scores depending on market and sample characteristics (Aydoğmuş et al., 2022). During periods of systemic stress, ESG can also function as a resilience signal: evidence from the COVID-19 period suggests ESG performance can matter for investor perceptions and pricing during crises (Broadstock et al., 2021). In addition, climate-specific disclosure work indicates that climate risk disclosures can be positively associated with firm market value, while the valuation effect may change as attention to climate risk intensifies—highlighting that the market pricing of environmental disclosure can be dynamic and context-dependent (Vestrelli et al., 2023).

Within an integrated reporting perspective, environmental capital reporting is also embedded in multi-capitals disclosure models. Evidence that higher multiple capitals disclosure quality increases firm value implies that natural/environmental capital information becomes more value relevant when it is connected to strategy, risk, and financial performance rather than presented as standalone sustainability narrative (Sun et al., 2022). This aligns with the broader IR-quality thesis: disclosure quality (integration, connectivity, materiality) tends to be the key condition under which environmental capital reporting is most likely to translate into valuation benefits (Zennaro et al., 2024). Kenyan evidence similarly points to environmental/sustainability disclosure relevance but also suggests governance and credibility conditions matter. For NSE-listed firms, sustainability reporting has been examined as a predictor of firm value using long panels of annual reports, generally supporting the view that stronger sustainability disclosure is associated with higher firm value (Sustainability reporting and firm value at the NSE, 2023). More recent work using ESG dimension scores for NSE firms finds that ESG disclosures are related to firm value, reinforcing the relevance of environmental capital information in Kenyan capital markets (ESG disclosures and firm value of NSE-listed firms, 2025). Studies also indicate that governance can shape the reporting–value link: for instance, corporate governance moderates the relationship between social sustainability reporting and firm value, suggesting that stronger governance can make non-financial disclosures more credible and value relevant—an implication that is likely to extend to environmental reporting as well (Serem et al., 2024).

Overall, the environmental capital reporting literature provides stronger and more mature valuation evidence than manufactured capital reporting, but it also underscores persistent challenges—greenwashing risk, inconsistent metrics, and context sensitivity. For Kenya, where reporting practices and assurance remain uneven across firms (Injeni et al., 2019; Injeni et al., 2022), capital-specific models that jointly consider financial, manufactured, and environmental capital reporting may better explain firm value than single-stream approaches, especially if they test disclosure quality and control for firm-level heterogeneity.

III. Research Methodology

3.1 Sample Size and Data

Research philosophy guides how evidence is generated by clarifying assumptions about reality and what counts as credible knowledge (Saunders et al., 2019). This study adopts positivism, which assumes phenomena can be objectively observed and quantified, enabling hypothesis testing using statistical procedures (Žukauskas et al.,

2018). The researcher remains an impartial analyst, and results should be replicable given the same reports and model specifications. Accordingly, it employs a panel data design, which observes multiple cross-sectional units over time and improves econometric inference by controlling unobserved heterogeneity (Hsiao, 2022; Wooldridge, 2010). The target population comprises all 62 firms listed on the Nairobi Securities Exchange between 2015 and 2022, and a census approach is used because the population is small and allows complete coverage (Kothari, 2004). Secondary data are extracted using a structured data collection sheet from audited annual reports available via the NSE, a common approach for objective, cost-effective firm-level analysis (Creswell & Creswell, 2018; Vartanian, 2010). Variables include net income alongside proxies for integrated reporting capitals (intangible assets, non-current assets, environmental management costs, and human-capital expenditure). Because the study relies on existing records, the dataset is evaluated for suitability by checking authenticity of reports, consistency of measures, and completeness across 2015–2022 before estimation (Vartanian, 2010).

3.2 Measurement of Variables

The following section presents the measurement of the variables of the study which are financial performance as the dependent variable and integrated reporting variables as independent variables.

Table 1: Measurement of variables

Variable	Category	Measurement	Formula	Source
Financial Capital Reporting	Independent	Equity Ratio	$\frac{Total\ financial\ capital}{Total\ Assets}$	Adegbie et al. (2019)
Intellectual Capital Reporting	Independent	Intangible Asset Ratio	$\frac{Total\ Value\ of\ Intangible\ Assets}{Total\ Assets}$	Adegboyegun et al (2020)
Manufactured Capital Reporting	Independent	Fixed Assets Ratio	$\frac{Non-current\ Assets}{Total\ Assets}$	Hazam & Mansor (2020)
Environmental Capital Reporting	Independent	Environmental Management Cost Ratio	$\frac{Total\ Environmental\ Management\ Cc}{Total\ Assets}$	Ghosh (20219)
Human Capital Reporting	Independent	Human Capital Ratio	$\frac{Total\ Human\ Capital}{Total\ Assets}$	Amorelli & Garcia (2020)
Firm Value	Dependent	Market to Book Ratio	$\frac{Total\ Market\ value}{Total\ Asset\ Value}$	Husna & Satria (2019)

Source: Authors

3.3 Regression Models

The overall model relating firm value to integrated reporting was of the form summarized in the equation 1 below;

$Yit = \beta 0 + \beta 1FCRit + \beta 2MCRit + \beta 3ECRit + \beta 4ICRit + \beta 5HCRit + \alpha i + Uit$ ……(1)

Where:

Y represents Firm Value

FCR represents Financial Capital Reporting

MCR represents Manufactured Capital Reporting

ECR represents Environmental Capital Reporting

ICR represents Intellectual Capital Reporting

HCR represents Human Capital Reporting

αi represents firm-specific error

Uit represents the idiosyncratic error.

Bo represents the regression constant

β1 – β5 represents slope coefficients indicating the effect of integrated reporting practices on firm value.

i denotes the listed firms adopting integrated reports at NSE

t represents time dimensions from 2015-2022.

IV. Descriptive Statistics

Panel summary statistics were generated to explore the overall distribution of study variables and establish the between and within firm variations. The statistics covered included the overall means, standard deviations, minimum and maximum values, number of observations, firms, and periods. Results presented in Table 2 indicate

the overall moderate temporal variations within and between firms. However, variations within firms appeared to be larger than between firms, suggesting that within-firm dynamics were critical to observed variations in firm value and integrated reporting.

Table 2: Panel Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Observation
Firm Value	Overall	.539	.221	.012	.986	N = 184
	Between		.106	.326	.710	n = 23
	Within		.195	.063	1.04	T = 8
Man. Capital Reporting	Overall	.469	.215	.013	.973	N = 184
	Between		.087	.298	.604	n = 23
	Within		.198	-.017	.932	T = 8
Env. Capital. Reporting	Overall	.545	.201	0	.973	N = 184
	Between		.127	.369	.808	n = 23
	Within		.157	.091	.927	T = 8
Intellect. Cap. Reporting	Overall	.459	.230	0	.986	N = 184
	Between		.097	.288	.652	n = 23
	Within		.209	.062	.971	T = 8
Human Cap. Reporting	Overall	.569	.210	0	.991	N = 184
	Between		.077	.461	.735	n = 23
	Within		.196	.031	1.08	T = 8
Financial Cap. Reporting	Overall	.497	.187	.012	.913	N = 184
	Between		.095	.288	.672	n = 23
	Within		.162	.053	.973	T = 8

Source: Authors computation

Specific results show that firm value, measured through market-to-book ratio, averaged a ratio of 0.539 with a moderate variation across firms demonstrated by a standard deviation of 0.221. Firm value in the stated period ranged between 1.2% and 98.6% of the expected maximum firm value across the 23 firms over the eight years. During the same period, manufactured capital reporting measured through fixed assets ratio achieved 46.9% of the expected maximum reporting and ranged between 1.3% and 97.3% across the firms over the eight years. While there were some fluctuations, manufactured capital reporting was consistent within and between the firms listed.

Environmental capital reporting was measured through an environmental management cost ratio of 0.545, indicating concerted efforts among the firms to report environmental concerns and outcomes. The standard deviation of 0.201 indicated moderate variation in environmental capital reporting. Regarding intellectual capital reporting, the firms under investigation averaged 45.9% of the intangible asset ratio. Firms reflected higher variations in intellectual reporting within and between them, ranging between 6.2% and 97.1%. The significant variations within firms may have been due to influences on intellectual capital reporting resulting from changes in priorities or reporting strategies.

Regarding human capital reporting measured via the human capital ratio, the overall mean ratio was 56.9%, with a moderate variation demonstrated by a standard deviation of 0.210 across the 23 firms over the eight years. This implies that firms had commendable efforts in filing human capital reports. The highest ratio, standing at 0.991, means that the firms with the most human capital reporting achieved a 99.1% level of reporting. Meanwhile, financial capital reporting, measured through equity ratio, depicts firms adhering to stable financial reporting practices. The overall mean was 49.7%, ranging from 1.2% to 91.3%. The between-firm variations were very small, showing consistency in reporting across firms. However, the within-firm variations indicate a possibility of periodic adjustments in financial reporting strategies.

4.1 Diagnostic Results

The Wooldridge test commonly used in one-way FE/RE panel settings to detect first-order serial correlation—returned $F(1,22)=2.97$ with $p=0.099$, so the study fails to reject the null of no AR(1) autocorrelation at the 5% level, implying no evidence that residuals are serially correlated over time . Stationarity was assessed using the Levin–Lin–Chu (LLC) panel unit-root procedure, where a significant result ($p<0.05$) supports rejecting the null that panels contain unit roots . All key variables (firm value and the five capital-reporting measures) reported adjusted t* statistics with $p=0.000$, indicating that each series is stationary over the eight-year period, reducing concerns about spurious regression relationships and supporting estimation in levels rather than requiring differencing or co-integration approaches.

Table 3: Diagnostic test results

Diagnostic test	Purpose in panel models	Null hypothesis (H0)	Test statistic	p-value	Decision at 5%	Implication for modelling
Wooldridge test for serial correlation (panel autocorrelation) (Stata)	Checks first-order autocorrelation in idiosyncratic errors in FE/RE panel models (Stata)	No first-order autocorrelation	F(1,22) = 2.97	0.099	Fail to reject H0	No evidence of AR(1) serial correlation in residuals
Levin–Lin–Chu (LLC) panel unit-root test (NTU Homepage)	Tests whether each series is non-stationary (unit root) across panels (NTU Homepage)	Panels contain unit roots				
└ Firm value (Adjusted t*) (NTU Homepage)	Stationarity check	Unit root	t* = −4.11	0.000	Reject H0	Stationary
└ Manufactured capital reporting (Adjusted t*) (NTU Homepage)	Stationarity check	Unit root	t* = −11.10	0.000	Reject H0	Stationary
└ Environmental capital reporting (Adjusted t*) (NTU Homepage)	Stationarity check	Unit root	t* = −6.68	0.000	Reject H0	Stationary
└ Intellectual capital reporting (Adjusted t*) (NTU Homepage)	Stationarity check	Unit root	t* = −8.71	0.000	Reject H0	Stationary
└ Human capital reporting (Adjusted t*) (NTU Homepage)	Stationarity check	Unit root	t* = −6.59	0.000	Reject H0	Stationary
└ Financial capital reporting (Adjusted t*) (NTU Homepage)	Stationarity check	Unit root	t* = −4.49	0.000	Reject H0	Stationary

Source: Authors computation

4.2 Regression Analysis

The panel-regression results reported in Tables 4–6 assess whether capital-specific reporting (financial, manufactured, and environmental) is value-relevant for listed Kenyan firms. Because firm value is observed repeatedly for the same companies across years, panel estimators are appropriate for separating the impact of reporting quality from unobserved firm-specific factors that are persistent over time (e.g., business model, corporate culture, baseline governance quality). In practice, the choice between random effects and fixed effects matters because random effects assumes that the unobserved firm effect is uncorrelated with the regressors, while fixed effects allows correlation by using within-firm variation over time (Clark & Linzer, 2015). The reported sigma_u, sigma_e, and rho in all three tables show how much of the total variance is attributable to firm-specific effects (u_i) versus idiosyncratic shocks (e_it), which helps gauge how strongly unobserved firm heterogeneity shapes firm value.

Financial capital reporting and firm value in table 4 shows a large and highly significant positive association between financial capital reporting and firm value ($\beta = 0.915$, $z = 16.39$, $p < .001$). Interpreted substantively, a one-unit increase in the financial capital reporting index/score is associated with an estimated 0.915-unit increase in firm value, holding the firm effect structure constant. This result is consistent with the information-environment argument in integrated reporting research: higher-quality disclosure improves investor understanding of the firm's cash-flow generating capacity and risk profile, which can raise valuation by reducing information processing costs and perceived uncertainty (Lee & Yeo, 2016). It also aligns with evidence that higher-quality integrated reporting is associated with higher firm value through capital-market channels (e.g., better liquidity) and real-effects channels (e.g., better internal decision-making and investment efficiency) (Barth et al., 2017).

The variance decomposition further suggests that, in this model, most variation in firm value is not driven by time-invariant firm effects: rho = 0.026 implies only about 2.6% of the variance is attributable to unobserved firm-

specific heterogeneity, while the larger sigma_e (0.138) indicates that time-varying shocks dominate. Practically, this means that financial capital reporting appears strongly value-relevant even when persistent firm differences are accounted for, consistent with the idea that markets price improvements in the quality/extent of financial capital disclosure as new information arrives. The positive, significant intercept (0.084, p = .005) simply indicates a positive baseline firm value when the reporting score is zero (though the economic meaning depends on the scale of your indices).

Manufactured capital reporting and firm value in table 5 indicates that manufactured capital reporting also has a positive, statistically significant relationship with firm value (β = 0.519, z = 7.83, p < .001). This supports the argument that disclosures about operational capacity—such as productive assets, infrastructure, technology, and capital investment narratives—help investors assess the sustainability of future earnings and operational resilience. In integrated reporting terms, manufactured capital is one of the "six capitals" that explains how firms convert inputs into outputs and outcomes over time; stronger multi-capital disclosure is associated with higher firm value in empirical settings because it provides a more complete value-creation story to both investors and non-financial stakeholders (Sun et al., 2022).

Notably, the year dummies (2016–2022) are statistically insignificant at conventional levels (most p-values > .10), with 2022 marginal (p = .063). This pattern suggests that, after accounting for manufactured capital reporting, there is no strong evidence of systematic year-by-year shifts in firm value relative to the omitted base year in this specification—i.e., the manufactured capital reporting effect is not merely proxying for common time shocks. The random component remains modest: rho = 0.062 indicates about 6.2% of the variance in firm value is due to unobserved firm effects (u_i). Compared to Table 4, this slightly higher rho implies that persistent firm differences play a somewhat larger role when focusing on manufactured capital reporting, which is intuitive because physical/operational capability is often deeply embedded in firm structure and strategy.

Environmental capital reporting and firm value in table 6 shows that environmental capital reporting is positively related to firm value but with a smaller coefficient and weaker statistical significance (β = 0.244, t = 2.17, p = .041). This implies that environmental disclosure is value-relevant, but the market response may be more nuanced, potentially because environmental information is harder to measure, more heterogeneous across sectors, and sometimes interpreted as either (a) a signal of superior risk management or (b) an exposure indicator that highlights future liabilities. Still, prior research generally supports the idea that high-quality environmental disclosure can be priced through both expected cash-flow effects and discount-rate effects. For example, detailed voluntary environmental disclosure quality has been linked to firm value through both expected future cash flows and the cost-of-equity component (Plumlee et al., 2015). Likewise, capital markets appear to price carbon-related environmental information; investors can penalize higher emissions while also valuing the act of disclosure as informative (Matsumura et al., 2014).

A key distinction in Table 6 is the stronger role of firm-specific heterogeneity: rho = 0.273 indicates that about 27.3% of the variation in firm value is attributable to time-invariant firm effects. This suggests that environmental capital reporting and firm value are more tightly intertwined with stable firm attributes (e.g., industry pollution intensity, long-run environmental strategy, and baseline governance), reinforcing why a within-firm (fixed-effects style) interpretation is often compelling in environmental disclosure contexts (Clark & Linzer, 2015). The significant intercept (0.406, p < .001) again reflects a positive baseline valuation conditional on the model's scaling.
Overall implication for your study. Across the three models, all coefficients are positive and statistically significant, supporting the conclusion that better reporting on financial, manufactured, and environmental capital is associated with higher firm value for listed companies in Kenya. The magnitude pattern—financial capital reporting (0.915) > manufactured (0.519) > environmental (0.244)—is also theoretically plausible: financial capital disclosures tend to be most directly comparable and immediately decision-useful for valuation, while manufactured and environmental disclosures add incremental information about productive capacity and long-run risk/resilience (Barth et al., 2017; Lee & Yeo, 2016; Sun et al., 2022). At the same time, the higher rho for environmental reporting indicates that environmental value relevance is more embedded in enduring firm characteristics, so interpretation should emphasize within-firm improvements and the role of persistent strategic positioning in shaping both disclosure and valuation outcomes.

Table 4: Financial Capital Reporting and Firm Value

Firm Value	**Coef.**	**Std. Err**	**z**	**p>|z|**
Financial Capital Reporting	.915	.056	16.39	0.000

Intercept	.084	.030	2.80	0.005
Sigma_u	.023			
Sigma_e	.138			
rho	.026	(fraction of variance due to u i)		

Source: Authors computation

Table 5: Manufactured capital reporting and firm value

Firm Value	**Coef.**	**Std. Err**	**z**	**p>|z|**
Manufactured capital reporting	.519	.066	7.83	0.000
YEAR				
2016	-.061	.055	-1.11	0.266
2017	-.022	.054	-.40	0.686
2018	.041	.055	.75	0.452
2019	-.022	.054	-.40	0.691
2020	-.061	.055	-1.11	0.266
2021	-.0001	.054	-0.00	0.998
2022	-.101	.054	-1.86	0.063
Intercept	.324	.046	7.00	0.000
Sigma_u	.047			
Sigma_e	.182			
rho	.062	(fraction of variance due to u_i)		

Source: Authors computation

Table 6: Environmental Capital Reporting and Firm Value

Firm Value	**Coef.**	**Robust Std. Err**	**t**	**p>|t|**
Environmental Capital Reporting	.244	.113	2.17	0.041
Intercept	.406	.061	6.61	0.000
Sigma_u	.125			
Sigma_e	.204			
rho	.273	(fraction of variance due to u_i)		

Source: Authors computation

V. Conclusion and recommendations

Analyzing firms listed on the Nairobi Securities Exchange (NSE) over the period 2015–2022, this study examined the effect of financial capital reporting, manufactured capital reporting, and environmental capital reporting on firm value. The empirical results provide consistent evidence that all three dimensions of capital reporting are positively associated with firm value, implying that companies that disclose more comprehensively and credibly about how they mobilize financial resources, deploy productive assets, and manage environmental impacts tend to enjoy higher market valuation. Overall, the findings suggest that investors on the NSE place the greatest weight on reporting that directly clarifies financial strength and capital stewardship, while still valuing disclosures about productive capacity and environmental risk management.

The strong influence of financial capital reporting indicates that the Kenyan capital market rewards firms that reduce information asymmetry through clearer, more decision-useful disclosures about financing strategy, liquidity management, capital allocation, and the firm's ability to sustain and grow its funding base. Manufactured capital reporting also appears to add meaningful information about operational capability and long-term productive potential, thereby strengthening investor confidence in sustainable value creation. Environmental reporting remains value-relevant, but its influence appears more dependent on firm-specific characteristics such as sector exposure, governance quality, and long-run strategic orientation. This suggests that environmental disclosure is interpreted through the lens of each firm's underlying environmental risk profile and credibility. Overall, the results support the conclusion that multi-capital reporting is value relevant for NSE-listed firms: better disclosure quality and breadth across capitals is associated with higher firm value because it improves market transparency, strengthens stakeholder trust, and signals stronger risk management and strategic coherence.

Based on these findings, several recommendations emerge. First, NSE-listed firms should institutionalize high-quality financial capital reporting by improving the clarity, completeness, and consistency of disclosures on capital structure, financing sources, liquidity planning, and capital allocation decisions. Firms should strengthen the linkage between narrative explanations and reported financial outcomes, and ensure reporting is timely and comparable across periods, because investors appear to respond most strongly to credible financial capital information. Second, firms should deepen manufactured capital reporting by providing more decision-useful disclosure on capital investments, asset utilization, technology upgrades, maintenance practices, operational efficiency initiatives, and business continuity capacity. This strengthens the market's understanding of the firm's productive strength and long-term competitiveness, particularly in asset-intensive sectors.

Third, firms should enhance environmental capital reporting by focusing on material, quantified, and verifiable information—such as environmental performance metrics, compliance status, risk mitigation actions, and resource-efficiency initiatives—rather than broad statements. Environmental disclosure should be explicitly connected to financial implications, including cost savings, regulatory exposure, reputation risk, and long-term resilience. Where feasible, firms should consider independent assurance to strengthen credibility and investor confidence. Fourth, regulators and capital market institutions—such as the Capital Markets Authority (CMA), NSE, and professional bodies—should promote greater standardization and assurance of multi-capital disclosures to improve comparability and reduce the risk of symbolic reporting. Clearer guidance aligned with integrated reporting principles and sustainability standards, adapted to sector materiality, would help investors interpret manufactured and environmental disclosures more consistently.

Fifth, investors and analysts should incorporate multi-capital reporting indicators into valuation and engagement processes, since the findings suggest these disclosures contain incremental information about value creation beyond conventional financial statements. Finally, future research should test whether the capital reporting–firm value relationships differ by sector, whether the links operate through mediating channels such as cost of capital or profitability, and whether governance quality strengthens or weakens the valuation impact of multi-capital disclosure. Further studies can also address potential endogeneity—where high-value firms may have more resources to disclose—using dynamic panel methods, and validate robustness using alternative measures of firm value.

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